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U. S. DEPARTMENT OF AGRICULTURE,

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THE CAUSE OF THE "SPEWING SICKNESS" OF SHEEP.

(PRELIMINARY NOTICE.)

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LOCATING THE CAUSE.

On the sheep ranges in the Wasatch Mountains, in Utah, there have been heavy losses of sheep from what is known locally as the "spewing sickness." It has been known that sheep in the higher ranges were affected by this disease, and when this trouble has appeared it has been the custom to take them lower, on "browse" range, when the symptoms would disappear. Many fatalities have occurred from this trouble, and it has been the popular opinion that sick sheep that do not die from it are permanently injured.

Careful examinations of the range have been made by members of this department, but few sick sheep were seen before the season of 1915. The description of symptoms given by the sheepmen corresponded very closely with those known to result from poisoning by the plant known as death camas (*Zygadenus venenosus*). The examination showed that the range contained a considerable quantity of the plant, and that it was abundant near the places where poisoning had occurred. It was therefore assumed that the probable cause of the difficulty was the death camas.

The location, in 1915, of the station for the experimental study of poisonous plants in the immediate vicinity of ranges where this spewing sickness occurs gave an opportunity for a thorough study of the subject. A better knowledge of the flora was obtained, and the sheep were studied under both corral and range conditions. The result of the summer's work was to show quite conclusively that the spewing sickness in the summer of 1915 was not caused by death camas but was due to another plant, which has been suspected by some of doing harm, but which has never before been definitely shown to be harmful. This plant is known locally as "sneezeweed," the botanical name being *Dugaldia hoopesii* Gray.

A considerable amount of experimental work was done in feeding sheep on this plant, and there seems to be no question not only that the plant is poisonous but also that it is the cause of this particular

trouble. Definite results were obtained in the study of the symptoms, pathology, dosage, and possible remedial measures. The work is, however, incomplete, and full publication will be possible only after further investigation. Meantime, inasmuch as there seems to be no doubt of the dangerous character of the plant, it has been deemed best to publish a preliminary notice, in order that the sheepmen may recognize the plant and be on their guard against it, for the plant is not localized but has a very wide distribution on the western ranges.

The closely related "sneezeweed" of the East, *Helenium autumnale* L., has long been known to be poisonous, but there has been no definite information in regard to the sneezeweed of the West.

DESCRIPTION OF THE PLANT.

Dugaldia hoopesii (fig. 1) belongs to the composite family, and is a rather stout perennial growing to a height of between 2 and 3 feet. The stem is leafy. The thick, entire leaves, of a deep-green color, are oblong, lanceolate, or, as in the lower ones, spatulate. There may be one or several flowers, which resemble a small sunflower. The rays are of an orange color, the disk a brownish orange. From the color of the flowers it is sometimes called "yellowweed." The plant grows at elevations of between 7,000 and 10,500 feet, and the blossoming period in the Wasatch Mountains ends the middle or last of August. It is found from Wyoming in the North to Arizona and New Mexico in the South, and as far west as California. While it is found in valleys and along streams, it is not confined in its habitat to low ground, but may grow well up on hillsides. It is a rank-growing plant, and, in some localities, has largely taken possession of extensive areas on the range.

ANIMALS AFFECTED.

While the work of the station on experimental animals is incomplete, it seems quite clear that under range conditions horses and cattle are not poisoned, while sheep suffer rather severely. It does not follow, of course, that cattle and horses may not be susceptible to the poisonous effect of the plant, but under ordinary range environment they do not eat largely of it.

SYMPTOMS.

The marked symptoms of poisoning by *Dugaldia* are depression, weakness, salivation, nausea accompanied with vomiting, and a weak, irregular pulse. Diarrhea is common, and bloating is a prominent symptom in sheep poisoned on the range. The effect on the pulse is especially characteristic, and it is evident that the toxic principle in large doses has a specific effect on the heart.

The symptoms correspond very closely with those produced by the eastern sneezeweed, *Helenium autumnale*, and it seems probable that the poisonous principle of *Dugaldia hoopesii* is similar to that



FIG. 1.—*Dugaldia hoopesii*, or western sneezeweed.

in *Helenium*. A chemical examination of the plant is being made, and it is expected the report can be made at the time of the detailed publication of the investigation of *Dugaldia* poisoning.

PARTS OF PLANT POISONOUS.

All parts of the plant are poisonous, but the experiments of the first summer seem to indicate that the flowers are somewhat more so than the leaves.

QUANTITY NECESSARY TO PRODUCE POISONING.

Dugaldia acts as a cumulative poison. It is probable that cases of acute poisoning rarely, if ever, occur on the range, though it is known that a sheep may be poisoned by eating $2\frac{1}{2}$ to 3 pounds in a single day. Most cases of range poisoning, however, are the result of feeding extending over several days or perhaps two or three weeks. In such cases a sheep probably eats an average of $1\frac{1}{2}$ pounds daily. The actual exhibition of symptoms may be precipitated by an unusually heavy feeding of a single day when hungry sheep come upon an especially thick area of the plant.

PREVENTION OF LOSSES.

At the present stage of the investigation no medicinal remedy can be recommended. The main reliance must be upon prevention. If herders recognize the dangerous character of the plant they can make it a point to see that their flocks do not graze on it. No bad results are to be expected from eating a few plants, but, inasmuch as it is a cumulative poison, care should be taken to see that the sheep do not get it day after day. Care should be taken, too, to prevent especially hungry sheep from grazing in an area of sneezeweed at any time, as, under such circumstances, cases of acute poisoning may result.